Complete Summary

GUIDELINE TITLE

Clinical practice guideline: endpoints of resuscitation.

BIBLIOGRAPHIC SOURCE(S)

Tisherman SA, Barie P, Bokhari F, Bonadies J, Daley B, Diebel L, Eachempati SR, Kurek S, Luchette FA, Puyana JC, Schreiber M, Simon R. Clinical practice guideline: endpoints of resuscitation. Winston-Salem (NC): Eastern Association for the Surgery of Trauma; 2003. 28 p. [93 references]

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Multiple organ dysfunction syndrome
- Hemorrhagic shock

GUIDELINE CATEGORY

Risk Assessment

CLINICAL SPECIALTY

Critical Care
Emergency Medicine
Surgery

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Emergency Medical Technicians/Paramedics
Nurses
Physicians

GUIDELINE OBJECTIVE(S)

- To demonstrate that the proposed endpoint(s) is (are) useful for stratifying the patients´ severity of physiologic derangement
- To demonstrate that the proposed endpoint(s) is (are) useful for predicting risk of development of multiple organ dysfunction syndrome (MODS) or death.
- To determine the endpoint(s) for resuscitation that would predict survival without organ system dysfunction if a defined level is achieved within a certain time frame.
- To improve patient survival and morbidity (organ system dysfunction) by use of appropriate resuscitation endpoint(s).

TARGET POPULATION

Severely injured trauma victims

INTERVENTIONS AND PRACTICES CONSIDERED

Resuscitation Endpoints

Global

1. Oxygen delivery
    - Supranormal oxygen
    - Mixed venous oxygen saturation (SVO_2)
2. Hemodynamic profiles
    - Central venous pressure (CVP)
    - Pulmonary capillary wedge pressure (PCWP)
    - Right ventricular end diastolic volume index (RVEDVI)
3. Acid-base status
    - Bicarbonate concentrations
    - Arterial lactate
    - End-tidal carbon dioxide levels

Regional

1. Tissue oxygenation and partial pressure of carbon dioxide (PCO_2)
    - Tissue oxygen and carbon dioxide electrodes
    - Near infrared spectroscopy (NIRS)
2. Gastric mucosal ischemia
    - Gastric tonometry
    - Sublingual monitoring of the partial pressure of carbon dioxide

- Physical examination

MAJOR OUTCOMES CONSIDERED

- Survival without organ system dysfunction
- Risk for multiple organ dysfunction syndrome or death
- Physiologic derangement

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The committee agreed upon the potential endpoints to be considered. Literature for review included human, trauma patients, and some attempted connection between the proposed endpoint and patient outcome (morbidity, survival, etc.), not just process variables. Some nontrauma studies of critically ill patients were also included, particularly if the parameter seemed promising in other surgical patients. Similarly, some non-human studies of promising techniques are discussed; though not part of the main review or recommendations. Medline and EMBASE were searched from 1980 to 2001.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Evidence Classification Scheme

Class I

Prospective randomized controlled trials (PRCTs) - the gold standard of clinical trials. Some may be poorly designed, have inadequate numbers, or suffer from other methodological inadequacies.

Class II

Clinical studies in which the data were collected prospectively, and retrospective analyses which were based on clearly reliable data. These types of studies include

observational studies, cohort studies, prevalence studies, and case control studies.

Class III

Most studies based on retrospectively collected data. Evidence used in this class includes clinical series, databases or registries, case reviews, case reports, and expert opinion.

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Level I

The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on Class I data; however, strong Class II evidence may form the basis for a Level I recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low quality or contradictory Class I data may not be able to support a Level I recommendation.

Level II

The recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. This recommendation is usually supported by Class II data or a preponderance of Class III evidence.

Level III

The recommendation is supported by available data but adequate scientific evidence is lacking. This recommendation is generally supported by Class III data. This type of recommendation is useful for educational purposes and in guiding future clinical research.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guidelines are forwarded to the chairmen of the Eastern Association for the Surgery of Trauma ad hoc committee for guideline development. Final modifications are made and the document is forwarded back to the individual panel chairpersons.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The levels of recommendation (I-III) and classes of evidence (I-III) are defined at the end of the "Major Recommendations" field.

Recommendations Regarding Stratifying Physiologic Derangement

Level I

1. Standard hemodynamic parameters do not adequately quantify the degree of physiologic derangement in trauma patients. The initial base deficit, lactate level, or gastric intramucosal pH (pHi) can be used to stratify patients with regard to the need for ongoing fluid resuscitation, including packed red blood cells and other blood products, and the risks of multiple organ dysfunction syndrome (MODS) and death.
2. The ability of a patient to attain supranormal oxygen delivery parameters correlates with an improved chance for survival.

Level II

1. The time to normalization of base deficit, lactate, and pHi is predictive of survival.
2. Persistently high base deficit or low pHi (or worsening of these parameters) may be an early indicator of complications (e.g., ongoing hemorrhage or abdominal compartment syndrome).
3. The predictive value of the base deficit may be limited by ethanol intoxication or a hyperchloremic metabolic acidosis, as well as administration of sodium bicarbonate.

Level III

1. Right ventricular end diastolic volume index (RVEDVI) measurement may be a better indicator of adequate volume resuscitation (preload) than central venous pressure or pulmonary capillary wedge pressure (PCWP).
2. Measurements of tissue (subcutaneous or muscle) oxygen and/or carbon dioxide levels may identify patients who require additional resuscitation and are at risk for multiple organ dysfunction syndrome and death.
3. Serum bicarbonate levels may be substituted for base deficit levels.

Recommendations Regarding Improved Patient Outcomes

Level I

1. There is insufficient data to formulate a level 1 recommendation.

Level II

1. During resuscitation, attempts should be made to increase oxygen delivery to normalize base deficit, lactate, or pHi during the first 24 hours. The optimal algorithms for fluid resuscitation, blood product replacement, and the use of inotropes and/or vasopressors have not been determined.

Definitions:

Strength of the Recommendation Scheme

Level I

The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on Class I data; however, strong Class II evidence may form the basis for a Level I recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low quality or contradictory Class I data may not be able to support a Level I recommendation.

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Level III

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Evidence Classification Scheme

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Class III

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CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate definition of endpoints useful for:

- Stratifying the patients´ severity of physiologic derangement
- Predicting risk of development of multiple organ dysfunction syndrome or death
- Prediction of survival without organ system dysfunction
- Improvement of patient survival and morbidity (organ system dysfunction) by use of appropriate resuscitation endpoints.

POTENTIAL HARMS

Not stated

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2003

GUIDELINE DEVELOPER(S)

Eastern Association for the Surgery of Trauma - Professional Association

SOURCE(S) OF FUNDING

Eastern Association for the Surgery of Trauma (EAST)

GUIDELINE COMMITTEE

EAST Practice Management Guidelines Workgroup

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Work Group Members: Samuel A. Tisherman, MD, FACS; Philip Barie, MD, FACS; Faran Bokhari, MD, FACS; John Bonadies , MD, FACS; Brian Daley, MD, FACS; Lawrence Diebel, MD, FACS; Soumitra R. Eachempati, MD, FACS; Stanley Kurek,

DO; Fred A. Luchette, MD, FACS; Juan Carlos Puyana, MD, FACS; Martin Schreiber, MD, FACS; Ronald Simon, MD, FACS

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Eastern Association for the Surgery of Trauma (EAST) Web site.

Print copies: Available from the Eastern Association for the Surgery of Trauma Guidelines, c/o Fred Luchette, MD, Loyola University Medical Center, Department of Surgery Bldg. 110-3276, 2160 S. First Avenue, Maywood, IL 60153; Phone: (708) 327-2680; E-mail: fluchet@lumc.edu.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Utilizing evidence based outcome measures to develop practice management guidelines: a primer. Allentown (PA): Eastern Association for the Surgery of Trauma; 2000. 18 p. Electronic copies: Available from the Eastern Association for the Surgery of Trauma (EAST) Web site.

An excerpt is also available:

- Pasquale M, Fabian TC. Practice management guidelines for trauma from the Eastern Association for the Surgery of Trauma. J Trauma 1998 Jun;44(6):941-56; discussion 956-7.

Print copies: Available from EAST Guidelines, c/o Fred Luchette, MD, Loyola University Medical Center, Department of Surgery Bldg. 110-3276, 2160 S. First Avenue, Maywood, IL 60153; Phone: (708) 327-2680; E-mail: fluchet@lumc.edu.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on April 21, 2004. The information was verified by the guideline developer on August 5, 2004.

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Date Modified: 9/25/2006